Rocky Mountain Spotted Fever

December 2003

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Rocky Mountain spotted fever (RMSF) is caused by the bacterium *Rickettsia rickettsii*.

B. Clinical Description and Laboratory Diagnosis

The onset of RMSF is sudden. Cases usually present with a moderate to high fever, significant malaise, muscle pain, headache, chills, and conjunctival infection. Over half of cases develop a rash or small bruises on the arms and legs, which typically begins 2–6 days after the onset of illness. The rash spreads to the palms and soles, and then to much of the body. Among untreated individuals, these signs and symptoms typically persist for 2 to 3 weeks, and the case-fatality rate ranges from 13% to 25%. More advanced manifestations include loss of red blood cells (anemia) and platelets (thrombocytopenia), severe clotting disorders, involvement of the major organ systems, and shock. Severe cases can result in long-term illness that are often neurological. If the disease is promptly recognized and treated, death is uncommon. However, for the United States overall, the reported case-fatality rate for RMSF has been 3–5% in recent years. There is no widely available laboratory assay that provides rapid confirmation of early RMSF. Serologic assays such as indirect fluorescent antibody (IFA) and immunostaining of skin or organs tissue for *R. rickettsii* are used to confirm RMSF. IgM antibodies appear by the end of the first week of illness, and IgG antibodies develop after 7 to 10 days after onset of illness.

C. Vectors and Reservoirs

In New Jersey, the primary vector for RMSF is the American dog tick (*Dermacentor variabilis*), which also serves as a reservoir. The lone star tick, *Amblyomma americanum,* is also a vector of RMSF in southern parts of the state. Among ticks, *R. rickettsii* is spread through eggs (transovarial transmission) and between life stages (transstadial transmission). The rabbit tick*, Haemaphysalis leporispalustris*, and the other two vector ticks play an important role in maintaining *R. rickettsii* among rodents and rabbits.

D. Modes of Transmission

RMSF is acquired from a tick bite. Laboratory data suggest that the tick must remain attached for 4 to 6 hours before the transmission of *R. rickettsii* can occur.

E. Incubation Period

Signs of RMSF typically develop one week after exposure (range: 3 to 14 days). The length of the incubation period is associated with the magnitude of exposure to *R. rickettsii*.

F. Period of Communicability or Infectious Period

RMSF is not communicable from person-to-person.

G. Epidemiology

While most cases have been reported in southern and midwestern states, RMSF is widespread in the United States and cases have been reported from many areas within New Jersey. Approximately 10 cases of RMSF are reported annually to the New Jersey Department of Health and Senior Services (NJDHSS). RMSF incidence rises between April and October, when the risk of contact with ticks is greatest. The risk of mortality from RMSF is higher for men, people over the age of 40, non-whites, individuals who do not develop (or recognize) the typical rash and individuals with no history of a tick bite. Several of these factors associated with higher mortality are likely due to delay in diagnosis and treatment. As children tend

to have more contact with tick-infested areas, most cases are under the age of 15. While rare, accidental transmission in the laboratory setting has been reported.

2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

CASE CLASSIFICATION

A. **CONFIRMED**

A clinically compatible case **AND** one or more of the following laboratory tests:

- Fourfold or greater rise in antibody titer to *Rickettsia rickettsii* antigen by immunofluorescence antibody (IFA), complement fixation (CF), latex agglutination (LA), microagglutination (MA), or indirect hemagglutination antibody (IHA) test in acute- and convalescent-phase sera specimens ideally taken greater than or equal to 3 weeks apart, **OR**
- Positive PCR assay to *Rickettsia rickettsii*, **OR**
- Demonstration of positive immunofluorescence of skin lesion biopsy or organ tissue, **OR**
- Isolation of *Rickettsia rickettsii* from a clinical specimen.

B. **PROBABLE**

A clinically compatible case **AND**:

- Single IFA serologic titer of greater than or equal to 64; **OR**
- Single CF titer of greater than or equal to 16; **OR**
- Fourfold rise in titer or a single titer greater than or equal to 320 by Proteus OX-19 or OX-2; **OR**
- Single titer greater than or equal to 128 by an LA, IHA, or MA test.

C. **POSSIBLE**

Initially reported on the basis of clinical diagnosis, until confirmation is obtained or probable case status is established; no possible case qualifications are retained.

B. Laboratory Testing Services Available

The Public Health and Environmental Laboratories (PHEL) provide serological testing services on paired sera for *R. rickettsii* by indirect fluorescent antibody (IFA) methodology. Tick testing is also available for the presence of *R. rickettsii* by direct fluorescent antibody (DFA) methodology. Questions regarding sample submission should be directed to 609-292-5819.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify where RMSF occurs in New Jersey, and to recognize areas in New Jersey where RMSF incidence has changed (increased or decreased).
- To focus preventive education and to target tick control measures.

B. Laboratory and Healthcare Provider Reporting Requirements

The New Jersey Administrative Code (N.J.A.C. 8:57-1.8) stipulates that health care providers and laboratories report (by telephone, confidential fax or in writing) all cases of RMSF to the local health officer having jurisdiction over the locality in which the patient lives, or, if unknown, to the health officer in whose jurisdiction the health care provider requesting the laboratory examination is located. The health

care providers must report all cases of RMSF to the local health officer having jurisdiction over the locality in which the patient lives.

C. Local Department of Health Reporting and Follow-Up Responsibilities

1. **Reporting Requirements**
The New Jersey Administrative Code (N.J.A.C. 8:57-1.8) stipulates that each local health officer must report the occurrence of any case of RMSF, as defined by the reporting criteria in Section 2 A above. Current requirements are that cases be reported to the NJDHSS Infectious and Zoonotic Diseases Program (IZDP) using CDC Tick-Borne Rickettsial Disease Case Report Form, or the report can be filed electronically over the Internet using the confidential and secure Communicable Disease Reporting System (CDRS).

2. **Case Investigation**
   a. It is the local health officer's responsibility to complete the CDC Tick-Borne Rickettsial Disease Case Report Form by interviewing the patient and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the patient's healthcare provider or the medical record.

   b. Use the following guidelines to assist you in completing the form:
      1) Accurately record the demographic information, health care provider information, whether hospitalized (and associated dates), and date of symptom onset. Check if clinically compatible illness was present (fever or rash, plus one or more of the following signs: headache, myalgia, anemia, thrombocytopenia, leukopenia, or elevated hepatic transaminases). Ask if an underlying immunosuppressive condition was present. Specify any life threatening complications in the clinical course of illness. Record laboratory information, and outcome of disease (*e.g.,* recovered, died).
      2) Exposure history: Use the incubation period range for Rocky Mountain spotted fever (3–14 days). Specifically, focus on the period beginning a minimum of 3 days prior to the patient's onset date back to no more than 14 days before onset for the following exposures:
         a) Tick bite history: ask if the patient was bitten by a tick. If yes, record information about the duration of tick attachment, date(s) and geographic location(s) where patient was bitten (enter this into the "Comments" section of the form).
         b) Travel history: check if the patient traveled outside county of residence within the 30 days of onset of symptoms.
      3) If the patient was diagnosed at the same time with another tick borne disease (such as Lyme disease, ehrlichiosis, or babesiosis) please refer to other chapters in this manual and complete the appropriate case report forms.
      4) If there have been several tempts to obtain patient information (*e.g.,* the patient or healthcare provider does not return calls or respond to a letter, or the patient refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as possible. Please note on the form the reason why it could not be filled out completely. **If CDRS is used to report, enter collected information into the "Comments" section.**

   c. After completing the case report form, attach lab report(s) and mail (in an envelope marked "Confidential") to NJDHSS IZDP, or the report can be filed electronically over the Internet using the confidential and secure CDRS. The mailing address is:

      NJDHSS
      Division of Epidemiology, Environmental and Occupational Health
      Infectious and Zoonotic Diseases Program
      P.O. Box 369
      Trenton, NJ 08625-0369

d. Institution of disease control measures is an integral part of case investigation. It is the local health officer's responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 4, "Controlling Further Spread."

4) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (N.J.A.C. 8:57-1.10)

None.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

None.

D. Preventive Measures

Environmental Measures

To prevent RMSF, advise patients and residents to make their yard less attractive to ticks through:

- Removal of leaf litter and brush from around your home.
- Pruning low lying bushes to let in more sunlight.
- Mowing lawns regularly.
- Keeping woodpiles in sunny areas, off the ground.
- If individuals are going to use acaracides (pesticide that specifically targets ticks) around their home, advise them to follow the label instructions and never use them near streams or other bodies of water.

Personal Preventive Measures/Education

The best preventive measure is to avoid tick-infested areas. In areas where contact with ticks may occur, individuals should be advised of the following:

- Wear long-sleeved shirts and long, light-colored pants tucked into socks or boots.
- Stay on trails when walking or hiking.
- Use insect repellents properly. Repellants that contain DEET (diethyltoluamide) should be used in concentrations no higher than 10% for children and 30% for adults. Remember, repellants should *never* be used on infants. Permethrin is a repellent that can only be applied to clothing, *not* exposed skin.
- After each day spent in tick-infested areas, check themselves, their children, and their pets for ticks. Clothing should also be checked.
- Promptly remove any attached tick using fine-point tweezers. The tick should not be squeezed or twisted, but grasped close to the skin and pulled straight out with steady pressure. Once removed, the tick should be drowned in rubbing alcohol or the toilet.

ADDITIONAL INFORMATION

A *Rocky Mountain Spotted Fever Fact Sheet* can be obtained at the NJDHSS website at <www.state.nj.us/health>.

The formal CDC surveillance case definition for Rocky Mountain Spotted Fever is the same as the criteria outlined in Section 2 A of this chapter. CDC case definitions are used by state health departments and CDC to maintain uniform standards for national reporting. When reporting to the NJDHSS, always refer to Section 2 A.

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